

Appendix: Reviews and theoretical syntheses of spread and scale-up in healthcare

For the purposes of the table below, 'systematic review' means a paper describing an explicit search strategy and formal analytic approach to data extraction and combining primary literature. 'Narrative review' means a review that had a specific goal or research question but no explicit search strategy. 'Theoretical synthesis' means a section of an empirical paper which synthesised the theoretical literature on a particular approach to scale-up or spread that was not covered in other reviews. 'Realist synthesis' means a review that used realist methods to identify context-mechanism-outcome configurations. One primary study (Renedo 2015), with a narrative review as part of the same paper, was included as this was the only paper to address the inclusion of patients and lay people in the spread and scale-up effort.

Author, Year (country of lead author)	Goal of review	Study design (theoretical lens)	Inclusion criteria for primary studies	Main findings
IMPLEMENTATION SCIENCE APPROACHES				
Barker 2015 ¹ (USA)	Synthesise published sequential scaling-up frameworks into a new framework	Systematic review with empirical testing in two large projects in Africa (complex intervention lens)	Papers in English from peer-reviewed and grey sources on models, frameworks or theories for scale-up	Core components for scale-up: the sequence of activities required for scaling up; mechanisms to achieve uptake; and underlying factors and support systems. Authors advise a 4-phase process: [a] set-up (prepare the ground and test the intervention to be scaled up); [b] develop the scalable unit (an early testing phase); [c] test the intervention in a variety of settings representing a range of contexts; [d] replicate at full scale.
Renedo 2015 ² (UK)	Review the literature on patient and lay involvement in implementation science	Narrative review followed by a primary (longitudinal case) study in London, UK	Active efforts to involve patients and the public in improvement initiatives	Patient input to local spread and scale-up was helped by: [a] organisational emphasis on non-hierarchical, multidisciplinary collaboration; [b] recognition and respect from staff; [c] commitment to rapid action, including quick translation of research into practice; and [d] the process of constant data collection and reflection facilitated by improvement methods.
Charif 2017 ³ (Canada)	Synthesise empirical studies of scaling up evidence-based practice in primary care	Systematic review (knowledge translation / behaviour change lens)	Strategies to scale up evidence-based practice in primary care. Controlled trials, before-and-after studies and interrupted time series designs	14 studies, mostly before-and-after designs in specific clinical area e.g. newborn care, tuberculosis, with over-representation of low and middle-income countries. EPOC Effective Public Health Practice Project tool identified flaws in designs. Most common scale-up strategy was clinician education for behaviour change. Impacts of interventions were variable but most demonstrated some success.
Leeman 2017 ⁴ (USA)	Develop a classification system for implementation strategies	Narrative review (interactive systems framework lens)	Strategies to scale up evidence-based interventions	Scale-up strategies are a sub-set of implementation strategies. They may be targeted at individuals (e.g. motivation and capacity to understand and use evidence), the inner organisational setting (leadership engagement, resources, infrastructure) or the outer setting (public policy; human and material resources; cross-setting learning and collaboration).
Indig 2018 ⁵ (Australia)	Evaluate public health interventions in high income countries that were scaled up or implemented at scale, using an evidence-based model of spread	Systematic review of primary studies, along with review of relevant conceptual frameworks	Primary studies with: 1) a public health intervention; 2) a chronic disease prevention focus; and 3) delivered at scale (state, national or international)	Successful spread was measured as 'institutionalised' (had become business as usual in a host organisation), 'commercialised' (delivered by or in partnership with private provider) or 'adapted' (customised to a particular setting or group). Unifying framework assumed a 4-stage pathway – development, efficacy testing, real world trial and dissemination – as the benchmark. Of 40 programmes, just over half had followed all 4 stages; the others had omitted one or more of the other stages (but succeeded nevertheless).
COMPLEXITY SCIENCE APPROACHES				
Eaton 2011 ⁶ (Nigeria)	Synthesise evidence on scaling up mental health interventions in low and middle income countries	Systematic review and survey of key national stakeholders	Empirical studies of scale-up of mental health interventions in countries meeting World Bank definition of LMIC	Scale-up requires a system-wide approach that includes political will, reorganisation of services, development and application of evaluation metrics and mobilisation of resources (see Box 3 for further detail).
Øvretveit 2011 ⁷ (Sweden)	Synthesise theoretical models for spread and scale-up of interventions in	Narrative review	Empirical studies and theoretical papers addressing intentional spread strategies	3 ways innovations spread in international health: [a] Hierarchical control (top-down, implementation science-based, tends to be structured and technocratic); [b] Participatory adaptation (decentralised, democratic but retains belief in accountability and rational planning); [c]

	international health			Facilitated evolution (support sites to build their capacity and identify fit for purpose solutions for their priorities).
Lanham 2013 ⁸ (USA)	Synthesise the literature on complexity approaches to scale-up and spread	Theoretical synthesis, applied to two large US case studies	Publications linking spread, scale-up and complexity	Strategies should: acknowledge unpredictability, recognise self-organisation, facilitate interdependencies and encourage sensemaking (see text for elaboration)
Greenhalgh 2017 ⁹ (UK)	Develop a framework to explain non-adoption, abandonment and challenges to scale-up, spread and sustainability of technology-based service innovations	Systematic review with empirical testing in six case studies in UK health and social care (complex adaptive system lens)	Frameworks for explaining or evaluating technology-based change in healthcare	Scale-up and spread of technology-based interventions depends on the dynamic interaction of a complex system. Key interacting domains include the illness or condition, the technology, the value proposition, the inner organisational context (including the implementation process), the wider external context, and evolution over time. Complexity in multiple domains reduces the chances of project success. System-level planning should include building adaptive capacity and resilience in people, organisations and technologies.
Øvretveit 2017 ¹⁰ (Sweden)	Synthesise system-level approaches to spread and scale-up	Theoretical synthesis, applied to two large US case studies (system science lens)	Not explicitly stated	Lessons for successful scale-up: [a] Prepare and assess context (including readiness for change and financial context); [b] Establish a 3S scale-up system (structure, strategy and system supports including facilitation); [c] Invest in, and draw upon, the 3S system to provide the oversight, facilitation and data to share knowledge and practices between implementing units; [d] Link with applied research.
SOCIAL SCIENCE APPROACHES				
Shaw 2017 ¹¹ (Canada)	Synthesise theories of social practice relating to spread of technology-based innovations in health and social care	Theoretical synthesis with empirical application to a single UK-based case study in social care (social practice lens)	Theoretical lenses which considered spread as social or socio-technical practice	10 named theories: activity theory, socio-technical systems theory, several variants of practice theory, several variants of structuration theory, actor-network theory, technological sensemaking, normalisation process theory. All emphasise the reciprocal relationship between human behaviour/action, organisational and wider contextual influences including professional norms, social expectations, laws, regulations, material and practical constraints and resources.
Willis 2016 ¹² (Canada)	Undertake a realist synthesis of studies on scaling up complex interventions	Realist synthesis focusing on context-mechanism-outcome configurations	Case examples of scaling up a complex intervention	Complex interventions are more successful in some contexts than others. 4 mechanisms – awareness, commitment, confidence and trust – contribute to individuals' engagement with the scaling-up effort. These are differentially triggered in different contexts.
Currie 2019 (UK) ¹³	Synthesise theories of leadership relevant to spread of innovation in healthcare organisations	Theoretical synthesis with application to 12 innovation projects in UK healthcare (leadership lens)	Theories of leadership pertaining to spread of innovations among organisations	Organisational leaders are important for spread – both managerial (for allocating resources and setting climate) and professional (for engaging peers and influencing resource allocation). Hybrid clinician-managers may play a pivotal role, contingent on resources and organisational structure.

1. Barker PM, Reid A, Schall MW. A framework for scaling up health interventions: lessons from large-scale improvement initiatives in Africa. *Implementation Science* 2015;11(1):12.
2. Renedo A, Marston CA, Spyridonidis D, et al. Patient and Public Involvement in Healthcare Quality Improvement: How organizations can help patients and professionals to collaborate. *Public Management Review* 2015;17(1):17-34.
3. Charif AB, Zomahoun HTV, LeBlanc A, et al. Effective strategies for scaling up evidence-based practices in primary care: a systematic review. *Implementation Science* 2017;12(1):139.

4. Leeman J, Birken SA, Powell BJ, et al. Beyond “implementation strategies”: classifying the full range of strategies used in implementation science and practice. *Implementation Science* 2017;12(1):125.
5. Indig D, Lee K, Grunseit A, et al. Pathways for scaling up public health interventions. *BMC public health* 2018;18(1):68.
6. Eaton J, McCay L, Semrau M, et al. Scale up of services for mental health in low-income and middle-income countries. *The Lancet* 2011;378(9802):1592-603.
7. Øvretveit J. Widespread focused improvement: lessons from international health for spreading specific improvements to health services in high-income countries. *International Journal for Quality in Health Care* 2011;23(3):239-46.
8. Lanham HJ, Leykum LK, Taylor BS, et al. How complexity science can inform scale-up and spread in health care: understanding the role of self-organization in variation across local contexts. *Social Science & Medicine* 2013;93:194-202.
9. Greenhalgh T, Wherton J, Papoutsis C, et al. Beyond Adoption: A New Framework for Theorizing and Evaluating Nonadoption, Abandonment, and Challenges to the Scale-Up, Spread, and Sustainability of Health and Care Technologies. *Journal of medical Internet research* 2017;19(11):e367. doi: 10.2196/jmir.8775 [published Online First: 2017/11/03]
10. Øvretveit J, Garofalo L, Mittman B. Scaling up improvements more quickly and effectively. *International Journal for Quality in Health Care* 2017;29(8):1014-19.
11. Shaw J, Shaw S, Wherton J, et al. Studying scale-up and spread as social practice: theoretical introduction and empirical case study. *Journal of medical Internet research* 2017;19(7)
12. Willis CD, Riley BL, Stockton L, et al. Scaling up complex interventions: insights from a realist synthesis. *Health research policy and systems* 2016;14(1):88.
13. Currie G, Spyridonides D. Sharing leadership for diffusion of innovation in professionalized settings. *Human Relations* 2019;in press